Economic Analysis of Regulation of CPP

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I.   Basic Foundations of Competitive Analysis

1. Economic analysis typically relies on a basic foundation that economic agents,
    consumers and firms, act in an economically rational manner. By the term
    "economic rationality" economists mean that subject to available information,
    economic agents do the best they can. This approach to economic analysis has
    been the preferred approach for at least the past 50 years in economics.[1] In the
    U.S. and Australia, the federal courts have used the approach of economic
    rationality to impose a discipline on claims made by parties.[2] Both government
    competition authorities, e.g. the U.S. Merger Guidelines (MG, 1992), and the U.S.
    Supreme Court have stated that they will assume that firms behave in an
    economically rational manner. Indeed, the Merger Guidelines state specifically:
    "Throughout the Guidelines, the analysis is focused on whether consumers or
    producers 'likely would' take certain actions, that is, whether the action is in the
    actor's economic interest." (MG, ¶ 0.1) The New Zealand Commerce
    Commission Mergers and Acquisitions Guidelines also considers economic
    rationality in judging the probability of entry. (p. 29) Lacking the discipline of
    imposing economic rationality, parties can make conflicting claims of what might
    happen under a different set of economic circumstances, and no method may exist
    to decide between the claims. Using economic rationality often allows the more
    likely outcome to be determined.

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[1] Prof. P.A. Samuelson in his path breaking book, *Foundations of Economic Analysis* (Harvard University
Press, 1947) demonstrated this approach in many areas of economics. Prof. Samuelson won the Nobel
Prize for his approach. While a new brand of economics, "behavioral economics", considers departures
from individual rationality, to date no well-developed approach exists that can predicts consumer and
firms' behavior outside of the economic rationality approach.
[2] See e.g. U.S. Supreme Court, 106 S.Ct 1348 (*Matsushita*, 1986), and Federal Court of Australia—Full
Court in "Universal Music Australia vs. ACCC" (2003).

2. The Commerce Commission (CC) has implicitly adopted the economic rationality approach in its analysis. The CC has used the change in consumer surplus (e.g. ¶ 310) as a basis to decide whether regulation of mobile termination rates is in the long term benefit of end users (LTBE). Use of consumer surplus requires that consumers are acting in an economically rational manner. The basic assumption is that consumers will maximize their utility subject to price they face and a budget constraint on how much they can spend. The use of a demand curve (and demand elasticities) to determine how changes in price lead to changes in consumer surplus rest on a foundation of utility maximization.[3] Absent the assumption of utility maximization and economic rationality on the part of consumers, one cannot infer the change in consumer surplus, defined as the change in the amount of money a consumer would require to be as well off after a change in prices as before the change, from an observed demand curve.[4]

3. While the CC has adopted the presumption of economic rationality for consumer behavior, it has not followed a similar approach of using economic rationality to consider the behavior or firms. In particular, the CC implicitly assumes that the two mobile providers, Vodafone (VOD) and Telecom do not maximize profits, or equivalently maximize shareholder value. Given that both VOD and Telecom are publicly traded firms whose directors have a fiduciary duty to represent shareholders, I would find it quite surprising if the companies' managements did not behave in a profit maximizing manner.[5] Economists typically assume that large publicly traded firms act in an economically rational manner because if they failed to do, their competitors would gain at their expense. Thus, the economic force of competition leads to an even greater presumption that firms will act in an

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[3] See e.g. J. Hausman, "Exact Consumer Surplus and Deadweight Loss," American Economic Review, 71, 1981 and J. Hausman and W. Newey, "Nonparametric Estimation of Exact Consumers Surplus and Deadweight Loss," Econometrica, 63, 1995

[4] The ability to infer the change in consumer surplus depends on a mathematical condition, called the "integrability condition," discussed in Samuelson (1947) op. cit. and Hausman (1981) op. cit.

[5] Occasionally, a privately controlled firm may behave in a different manner when other reasons are considered, e.g. family succession in operating the company. However, given that VOD has the largest capitalization on the London Stock Exchange and Telecom has the largest capitalization on the New Zealand Stock Exchange a departure from profit maximization would be extremely surprising. Further, both companies are listed on the New York Stock Exchange and shareholder suits against boards of directors are quite common in the U.S.

economically rational manner, compared to consumers who in many areas when making decision are not affected by competition. Thus, I find it quite surprising that the CC would assume economic rationality of consumers but rejects the assumption of economic rationality of firms.

4. The CC rejects economically rational behavior by VOD and Telecom, when it summarily rejects what it calls the "waterbed effect" where regulation of mobile termination rates at cost will lead to an increase in handset prices or mobile originating rates in terms of a monthly subscription fee or per minutes charges. The CC states:

> "Consequently, the Commission is not persuaded by what is described as the 'waterbed' argument that a regulated reduction in mobile termination rates is likely to lead to a rise in the price of retail mobile services. It seems likely that mobile handset, subscription and calling charges would be unaffected." (¶ 12)

This claim by the CC is not based on economic analysis and is contrary to the analysis recently made by the ACCC. Further, it is unsupported by any empirical analysis of which I am aware. Most important, if the "waterbed effect" does not occur, VOD and Telecom would not be maximizing profits. Instead, they would be acting in an economically irrational manner.

5. This conclusion (which I discuss further below) follows because mobile companies under a calling party pays (CPP) regulatory framework receive revenue both from mobile subscriptions and originating calls and from terminating calls. The more subscribers a mobile company has, holding other factors equal, the more mobile terminating minutes it supplies. When a mobile company decides whether to increase its subscription price to increase its revenue, it must take into account the reduced number of subscribers and the reduction in terminating minutes that will occur.[6] At the margin, it sets the subscription price such that the marginal gain in profits from the higher subscription price is just offset by the marginal profit loss from fewer terminating minutes. If regulation forces down the price of mobile termination, the marginal profit loss from fewer terminating minutes is now less so the profit maximizing mobile company will set

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[6] By subscription prices I am considering the monthly subscription price or the price of originating minutes.

its subscription price higher.[7] The outcome of the "waterbed effect" exists because of profit maximization by mobile firms acting in an economically rational manner. Note that this conclusion follows whether the mobile company is a monopolist or faces competition.[8] The effect is likely to be larger the greater the degree of competition, but the CC is incorrect to decide "*ex cathedra*" that no effect on subscription prices will follow from decreased termination prices.

6. Two important implications follow from the recognition that mobile terminating prices and mobile subscription prices are linked because mobile providers act in an economically rational manner. First, the CC calculation of the change in consumer surplus is incorrect because it fails to take account of the change in mobile subscribers that arises from higher subscription prices.[9] Interestingly, even if I disregard the reduced consumer surplus for mobile subscribers, the CC results are still incorrect because fixed callers have fewer persons that can be reached on their mobiles. Thus, the demand curve for mobile termination will shift inwards with regulation of terminating prices. The CC model fails to take account of this inward shift and thus gives biased and unreliable results.

7. The second implication of allowing for rational economic behavior by mobile providers is that the market definition used by the CC is incorrect. Market definition is instrumental to help guide competitive analysis. To an economist the purpose of market definition is to demarcate firms and areas of competition that have a significant constraining effect on prices for a given product. Here profit maximizing behavior by mobile firms in setting mobile termination prices constrains the prices charged by firms in setting their mobile subscription prices. Thus, the price-setting decisions are linked and both mobile termination services

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[7] To the extent that a reduction in the termination price affects mobile subscriptions a regulatory problem would not arise since effective competing mobile providers would compete away the margin on terminating calls to gain more subscribers. However, a regulatory required reduction in the mobile termination prices will lead to an increase in the subscription price in this situation. If mobile providers are not effectively competitive, not all the margin will be competed away but subscription prices will still increase because of the lower profit margin on termination after regulatory intervention. Otherwise, the mobile providers were not profit maximizing before regulation occurred.

[8] This conclusion that even a monopolist will charge lower prices when it sells two complementary goods, a situation known as "Cournot complements," has been recognized in the economics literature for over 70 years. The economic logic underlies my research results in J. Hausman, "Does Bell Company Entry into Long-Distance Telecommunications Benefit Consumers?," <u>Antitrust Law Journal,</u> 70, 2002.

[9] I am assuming that demand curves slope downwards.

and mobile subscription services should be considered within the same market.

8. Otherwise, economic analysis cannot explain observed market actions. If the markets are separate a profit maximizing mobile provider should be charging the highest price it can in each market subject to competition. If regulation decreases the mobile termination price, the mobile provider should not be able to profitably increase the mobile subscription price; otherwise, it was not profit maximizing before the regulatory intervention. However, economic analysis demonstrates that a profit maximizing mobile firm will increase its mobile subscription price, which demonstrates the linkage between termination and subscription. This linkage also permits an understanding of likely behavior, which could not be correctly understood if the two termination and subscription services are not linked together in an overall mobile services market.

II. Effects on Mobile Providers

9. Telecom (and most likely Vodafone) is selling mobile handsets below incremental cost. This business strategy leads to greater demand for mobile subscriptions as my academic research has demonstrated.[10] Competition among mobile providers leads to this outcome.[11] However, note that even though handsets are sold below incremental cost the monthly subscription prices and outgoing mobile call prices typically lead to revenue greater than the incremental cost of providing handsets

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[10] See J. Hausman, "Mobile Telephone," in M. Cave et. al. eds, Handbook of Telecommunications Economics, North Holland, 2002. Other research has found similar effect in both mobile subscription and subscriptions for other services such as satellite TV. For example, in the U.S. satellite TV dishes are subsidized by providers, yet the providers have no market power since they are small relative to cable providers and two satellite competitors exist.

[11] While the CC takes no position on whether effective competition exists in NZ for mobile telephone (¶ 305), Telstra-Clear's (TC) market actions tend to demonstrate that effective competition exists. No barriers to entry exist for TC to enter the market. TC has the necessary spectrum and its corporate parent, Telstra, is the largest mobile provider in Australia and is returning over A$4 billion in special dividends to its shareholders, indicating more than sufficient surplus cash flow to easily fund a new network in NZ. Note that since both Telecom and VOD will be required to construct 3G networks, no significant barrier to entry exists from the requirement that TC would need to construct a 3G network. Thus, the CC conclusion regarding barriers to entry arising from sunk costs (¶ 290) is incorrect, because barriers to entry arise from asymmetries in required sunk investment costs, which does not exist here. Also, Hutchison has recently entered both the UK and Italy (among other countries) with 3G networks, demonstrating the absence of barriers to entry so long as spectrum is available. Given the absence of barriers to entry the mobile market in New Zealand is and will be effectively competitive.

and originating mobile services.[12]   The handset subsidies are partly recovered by increased mobile subscribers leading to more FTM and MTM calls and more mobile termination revenue for the mobile provider. However, mobile handset subsidies are even greater in the U.S. which has Receiving Party Pays (RPP) and which almost universal agreement exists that the mobile market is extremely competitive.[13]   Thus, handset subsidies in New Zealand cannot be claimed to be an outcome of the exercise of market power in mobile termination nor caused by CPP.

10. Under the proposed CC regulatory price policy, the economics of profit maximization demonstrates that handset, monthly subscription, and mobile originating prices will increase causing a decrease in mobile penetration, compared to what it would be absent the regulation.[14]   I do not expect a decrease in MTM call rates, since these are highly competitive currently and I expect the inter-network traffic to approximately balance out for the mobile networks.

11. When I consider the effect on the fixed line market, the answer depends in part on how much of the decrease in mobile termination charges will be passed on to fixed line customers. Even if all of the reduction were passed on, no increase in fixed line penetration would occur since it is near 100% in New Zealand. To the extent the reduction is passed on, additional FTM calls will be made. However, the number of people that own mobiles and can be reached by mobile will decrease compared to the counterfactual. I consider these two counteracting effects subsequently.

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[12] The economic definition of cross subsidy is whether revenues exceed incremental costs for an entire service. Thus, mobile subscriptions are not cross-subsidized when mobile phones are sold below incremental cost if services used and paid for by subscribers yield revenues above incremental costs. As I discuss, many very competitive industries subsidize equipment and earn incremental profits from providing services. Given the large proportion of fixed and common costs in telecommunications networks, the incremental profits cover part of the common costs while profits from terminating mobile services also cover part of the common costs.

[13] Recent reports from the Federal Communications Commission (FCC) confirm the high degree of competition. Indeed, neither the DOJ nor FCC raised an objection to the second largest mobile provider, Cingular, buying the third largest mobile provider AT&T Wireless.   Indeed, the FCC makes an explicit finding that the mobile industry in the US is "effectively competitive." See FCC, "Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, September 28, 2004, ¶ 2.

[14] Thus, mobile penetration might continue to increase but at a slower rate than otherwise. This result occurs because demand curves slope downwards since a higher price leads to less demand.

12. To the extent that a significant proportion of the decrease in mobile termination rates is not passed on to FTM calls, the outcome will be largely negative. A transfer of producers surplus will be made from the mobile providers to the fixed line providers. The fixed line providers have not made the (risky) investment in mobile networks that will become rapidly obsolete with the introduction of 3G mobile.

13. Thus, I conclude that overall there will be fewer mobile subscribers from the effect of the CC regulatory policy. Overall, the CC policy can only be favorable if the social value of increased FTM calls outweighs the negative effects of the CC policy. I now turn to an evaluation of this question.

III. The CC has Incorrectly Valued the Social Value of Addition Mobile Subscriptions and it Policy Would Decrease the LTBE

14. The CC has a specific regulatory policy goal for telecommunications: the Long Term Benefits of End-Users (LTBE). Other countries such as the U.S. and U.K. do not have this policy goal to guide their regulation.[15] In my academic research I have demonstrated why an explicit policy goal of consumer welfare leads to better regulatory policy.[16] I have concluded that the CC policy of LTBE (and the ACCC policy of LTIE) is an appropriate consumer welfare approach for telecommunications regulation. However, the CC has not applied an LTBE analysis correctly in the current situation.

15. The CC claims no effect will occur on the subscription price if the regulator forces down the mobile termination price from the profit maximizing level. I discussed above why this conclusion is incorrect if mobile firms act in an

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[15] Thus, ACCC references to UK regulatory policy for mobile termination are inappropriate since the UK does not consider the LTBE in its regulatory policy. Indeed, I have previously criticized UK regulator policy for harming consumers. See J. Hausman, "Mobile Telephone," in M. Cave et. al. eds, Handbook of Telecommunications Economics, North Holland, 2002.

[16] See e.g. J. Hausman, "Taxation By Telecommunications Regulation," Tax Policy and the Economy, 12, 1998; "Economic Welfare and Telecommunications Welfare: The E-Rate Policy for Universal Service Subsidies," Yale Journal on Regulation, 16, 1999; "A Consumer-Welfare Approach to the Mandatory Unbundling of Telecommunications Networks," Yale Law Journal, 1999; and "Regulated Costs and Prices in Telecommunications," in G. Madden ed. International Handbook of Telecommunications, 2003.

economically rational manner. I now demonstrate this conclusion formally using the profit maximizing first order conditions for a mobile provider.

16. I consider a profit function for a mobile provider which does not provide fixed line service:

(1)

$$\Pi(m, a_1, a_2) = x(m, a_1, a_2)(m - c_0) + q_1(a_1, x) * (a_1 - c_1) + q_2(a_2, x) * (a_2 - c_2)$$

m = monthly subscription price
a_1 = per call outgoing charge
a_2 = per call terminating charge
    (assume fixed part is either regulated or competitive)
$x(m, a_1, a_2)$ = number of mobile subscribers ($x_1 < 0$, $x_2 < 0$, $x_3 < 0$)
$q_1(a_1, x)$ = number of originating calls ($q_{11} < 0$, $q_{12} > 0$)
$q_2(a_2, x)$ = number of terminating calls ($q_{21} < 0$, $q_{22} > 0$)
c_0 = monthly cost of phone subsidy
c_1 = marginal cost of outgoing calls
c_2 = marginal cost of incoming calls

First Order Conditions (FOC) for Profit Maximization:

$$\frac{\partial \Pi}{\partial m} = x + \frac{\partial x}{\partial m}[(m - c_0) + \frac{\partial q_1}{\partial x}(a_1 - c_1) + \frac{\partial q_2}{\partial x}(a_2 - c_2)] \qquad (2)$$

Thus, m is lower without regulation because of the positive margin on outgoing and incoming calls. If the regulator sets $a_2 = c_2$ (or more generally decreases the amount $(a_2 - c_2)$) then the subscription price will be higher and mobile penetration will be lower.[17] The FOC must continue to equal zero after regulatory intervention and since the last term in brackets is smaller after regulatory intervention m or a_1 will need to increase.[18] I demonstrate this effect

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[17] I demonstrate this proposition formally in the appendix by applying the implicit function theorem. The CC (¶ 131) attempts to claim that this effect did not occur after regulation of mobile termination rates in the UK. However, the Report makes an analytical error. Not only did penetration decrease (or at best stay the same) but the previous growth of penetration of about 2.5% per year stopped. Thus, penetration appears lower than it would have been in the absence of regulation. Since demand curves slope downwards, this effect arises from higher subscription prices, absent an inward movement of the demand curve due to a recession or new economic substitute, which did not occur in the UK during this time period. While the Report (¶ 136) appears to recognize that previous trend growth needs to be taken into account, it does not control for this factor in its discussion.

[18] The CC claims (¶ 340) this effect occurs that termination profits only flows to mobile subscribers under

mathematically in the Appendix. Either change will lead to decreased mobile penetration. Thus, the demand curve for mobile termination will shift inwards with the implication that the CC consumer surplus calculation which keeps the position of the demand curve the same in the factual and counterfactual situations is incorrect.

17. The CC Report fundamentally misunderstands the economics of setting prices. The CC incorrectly believes that the mobile companies would (or would not) be required to "<u>recoup</u> any regulated reduction in mobile termination rates through increases in other tariffs" (¶ 427) depending on the amount of competition. In economic reality, no "waterbed" exists that with effective competition when some prices decrease other prices must increase. To the contrary companies set prices as high as they can to maximize their profits.

18. Correct economic analysis demonstrates that under both monopoly and competition that a regulated decrease in mobile termination rates will lead to an increase in mobile subscription rates because mobile operators are profit maximizing and cannot earn as much profits as before from an additional mobile subscriber so they will increase prices to mobile subscribers. Thus, all "economic profits do not need to be competed away" as the CC states (¶ 617) for mobile subscription prices to increase following regulation of terminating prices. This fundamental economic error of believing that a "waterbed" only exists under effective competition leads the CC to misunderstand how prices are set in real-world economic markets. For example, if regulators decreed that the price of a diet Coke was going to be 25% less, the price of a regular Coke would not increase—no "waterbed" need exist in the sense that if some prices go down other prices must go up.[19] It is the inter-relationship between mobile subscription and

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effective competition. This conclusion is incorrect as my economic analysis demonstrates, since I have not assumed effective competition. A similar result known in economics for over 50 years (although often at odds with what lawyers and regulators believe intuitively) is that if a <u>monopolist's</u> marginal costs decrease, the monopolist will find it can increase its profits by decreasing its price so it will decrease price. See e.g. J. Hausman and G. Leonard, "Efficiencies from the Consumer Viewpoint," <u>George Mason Law Review</u>, 7, 3, 1999.

[19] A "requirement" to recoup some price decreases with other price increases only occurs under regulation with cost based regulation. See J. Hausman, "Regulated Costs and Prices in Telecommunications," in G. Madden ed. <u>International Handbook of Telecommunications,</u> 2003.

mobile termination revenues that causes subscription prices to increase when mobile termination prices are artificially decreased by regulation.

19. The CC report examines mobile penetration in the UK after the regulatory imposition of reduced termination rates. The report correctly determines that it does not have sufficient data to make an informed conclusion. However, the CC Report never examines what has happened to mobile prices in the UK. Prices form a much better indication of the effects of regulation since economic analysis makes direct predictions about mobile prices. To examine the effect on prices I gathered data from the Ofcom website, "The Communications Market" report and used the appendices for August and October 2004. The data begins in Q1 of 2003 and goes to Q2 of 2004. I indexed the data to Q1 of 2003. Note that the regulated reduction in UK mobile termination prices occurred in July of 2003.

20. I present the results in Figure 1:

Figure 1: Comparison of Indexed Wireless Prices for U.S. and U.K
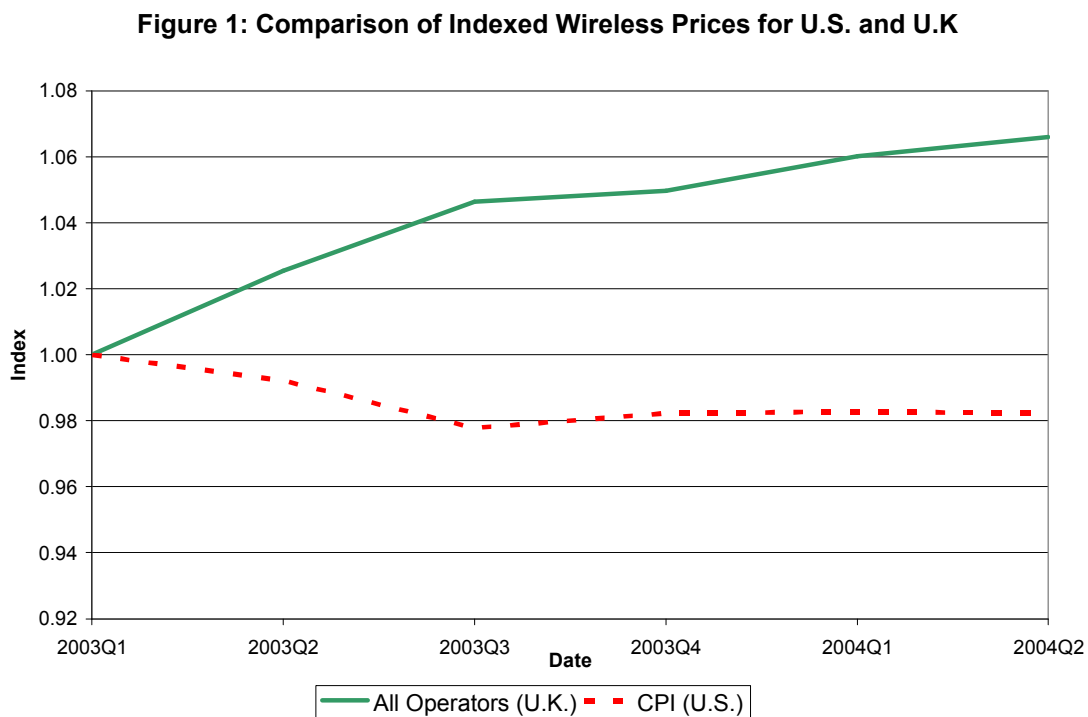
As Figure 1 indicates mobile price began to increase at the time of the regulatory imposed change in mobile termination prices and has continued to increase,

although at a slower rate.[20] As a comparison I used the US Bureau of Labor

Statistics (BLS) CPI for wireless telephone services (CUUR0000SEED03).[21]

Note that the US BLS CPI decreased by approximately 2% over the same period.

Thus, UK services mobile prices increased by 8.4% more than US mobile services

prices over the same period. Given that the handset and network markets are

international and that 3 of the top 5 US carriers use the same technology as the

UK operators, the price data indicate that the prediction of my economic analysis

has been confirmed by actual real world market experience.

21. In much of what follows I will assume the marginal social value of an additional

mobile subscriber is near zero in terms of the subscribers' consumers surplus.[22]

However, I will assume that the ability to call a mobile phone subscriber does

have value to the calling party--otherwise they would not spend their limited

budgets to place the calls. I will assume, along with the CC, for this analysis that

no reasonable substitute exists to reach a person except FTM.[23] I will make the

additional assumption that a caller who wants to reach a person cannot typically

substitute reaching another person. If significant substitution existed, no problem

would arise.

A. Value to the Calling Party from a FTM Call

22. What is the value to a given caller for the ability to reach a person through FTM?

Note I am looking at the economic welfare or consumer surplus of the calling

party only in what follows.[24] Consumer surplus gives the measure of net

economic value to a caller and has been used in economic analysis for over 100

years. If the potential receiving party does not have a mobile telephone economic

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[20] Among carriers, the minimum increase is 5.0% higher in the last period, Q2 of 2004, than in the first period.

[21] The U.S. is the only country that I know of that publishes a separate price index for mobile telephone services.

[22] If I allowed for this effect, I would find an even larger decrease in the LTBE from the CC proposed policy. Initially, I look only at the welfare effects of calling parties since the CC focuses on these consumers.

[23] Substitution from MTM would provide a substitute given the high penetration of mobile phones in NZ. Here I assume away this possibility since the CC does not take account of it. However, I use the CC assumed elasticity in my calculations

[24] If I take into account the consumer surplus of the receiving party of an FTM call, I would find even stronger results.

analysis calculates the "virtual" (reservation) price that sets demand to zero. I use this approach, which I have applied in my academic research, to calculate the consumers surplus to the calling party.[25] Let the (compensated) demand to call person n be h_n with price p_n. Let the virtual price that sets demand to zero be p_n^*. The change in consumers surplus from the ability to call person n is:

$$y^1 - y^* = (p_n^* - p_n^1)h_n(p^\#, u^1) = (p_n^* - p_n^1)\frac{\partial e(p^\#, u^1)}{\partial p_n} \quad for \ p^\# \in (p^*, p^1)$$

where $e(p, u^1)$ is the expenditure function evaluated at utility level u^1. If I were to assume that the virtual price that set demand to call person n at zero is \$3.00 (which may be low given the possibility of emergencies) while I assume that the current price to call person n, p_n = \$0.39 per minutes, the amount of consumer surplus would be \$2.61 multiplied by the number of incoming FTM calls evaluated at the price $p^\#$. The price $p^\#$ depends on the shape of the demand curve and the associated elasticities.

23. In order to consider the empirical magnitude of the change in consumer surplus when an additional subscriber buys a mobile subscription I use an approach I have developed in my academic research to bound the estimate.[26] I first calculate a lower bound for the amount using the approach in the above papers by assuming a linear demand and the assumptions made in the CC Report for Table 18 (p. 94). The CC uses a linear demand curve in its analysis as well as a constant elasticity demand curve.[27] I take the Telecom estimate of 3.01 million mobile subscribers (on all networks) and I use a per minute price of FTM to be \$0.3883 per minute for 2006 in the counterfactual according to the CC assumption. (Table 14, p. 87).

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[25] See J. Hausman, "Valuation of New Goods Under Perfect and Imperfect Competition", in T. Bresnahan and R. Gordon, eds., The Economics of New Goods, Univ. of Chicago Press, v58 (1996): 209-37; "Valuing the Effect of Regulation on New Services in Telecommunications", Brookings Papers on Economic Activity, Microeconomics, 1997: 1-38; "Cellular Telephone, New Products and the CPI," Journal of Business and Economics Statistics v17, 1999; "Mobile Telephone," in M. Cave et. al. eds, Handbook of Telecommunications Economics, North Holland, 2002; "The Competitive Effects of a New Product Introduction: A Case Study", with G. Leonard, Journal of Industrial Economics, 50, 2002; "Sources of Bias and Solutions to Bias in the CPI", Journal of Economic Perspectives, 2003.

[26] The discussion of the bounds is found in J. Hausman, "Sources of Bias and Solutions to Bias in the CPI", Journal of Economic Perspectives, 2003.

[27] The CC Report uses the two forms of demand curves in an inconsistent manner by comparing the results using one assumption to the other assumption. Here I calculate the results using the same form of demand curve in each comparison.

I use the CC elasticity estimate of −0.6 for the elasticity of FTM calls. Using the lower bound estimate (from a linear demand curve) I find the increase in consumers surplus to people calling the new subscriber to be $102 per year.[28] If instead, I use the upper bound estimate (constant elasticity demand curve) I estimate the gain in consumers surplus to FTM callers to be $386 per year. Thus, even if the new mobile subscriber receives no consumers surplus, people calling the subscriber receive substantial consumers surplus. Thus, the conclusion is that calling parties benefit significantly from additional mobile subscribers.

B. Effects on Mobile Penetration

24. How many new customers could be lost by this amount of FTM calling if mobile companies decrease handset subsidies and increase outgoing calling prices to the new subscribers? I also use the CC pass-through rate of 65% for 2006 and assume the FTM price to be $0.3883 cents per minute[29] I assume the mobile company charges $0.26 per minute for FTM calls and its marginal cost is $0.097 per minute.[30] I assume that 65% of the quasi-rent (incremental profit) for the new subscriber is competed away in a lower subscription fee. I take the annual subscriber fee to be $377.80 and I use a −0.55 subscription elasticity estimate which is consistent with my prior research and research by Frontier Economics.[31] Using the 3.01 million mobile subscribers I estimate that about 0.1222 million or about 4.5% would not subscribe if subscriber prices were to increase. Thus, the policies of "any to any connectivity" and "efficient use of the mobile infrastructure" are also promoted by the existence of the subsidy.[32] Using this

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[28] I have assumed that a new subscriber receives the average number of FTM minutes per year. The virtual price for this bound is estimated to be $1.04 per minute which is likely significantly too low. However, that is why the estimate gives a lower bound

[29] I assume the same pass through rate for mobile competitors as the CC assumes for landline. Evidence from Australia indicates that the pass through rate is higher for mobile companies.

[30] Thus, I assume that the incremental profit is the same in the counterfactual in 2006 as it is currently.

[31] The actual elasticity may be significantly higher for marginal customers who are deciding whether to subscribe.

[32] Since most of the fixed line network infrastructure for voice calls is a sunk cost investment with little new investment, economic analysis would not take account the "efficient use" of its infrastructure. However, since considerable new investment will occur for 3G networks, the "efficient use" of this infrastructure should be an important goal of regulation.

estimate I find that the additional consumers surplus to calling parties using FTM is between $12 and $47 million per year.

C. <u>Net Social Gain Estimation of the Long Term Benefits of End-Users</u>[33]

25. I now compare this estimate to the net gain in consumers surplus to calling parties from a lower FTM price. I assume that the mobile company termination price decreases from $0.26 to $0.16 and that the fixed operators completely pass through 65% of the reduction similar to the CC Report (p. 87) for 2006. The FTM price decreases from $0.3883 per minute to $0.3233 per minute. I calculate the gain in consumers surplus for FTM callers for all their calls, not just calls to additional mobile subscribers. I net out the transfer from calling parties to mobile subscribers, since I understand that the CC does not take account of income redistribution in its Long Term Benefits of End-Users (LTBE) approach. Using the same bounds approach I estimate the change to be between $3.1 million and $3.4 million per year. Thus, the ratio of the additional consumers surplus from the current FTM prices compared to the CC FTM regulated price is in the range of 4.0-13.7.[34] The CC proposal would make New Zealand consumers significantly worse off, and thus is not in the LTBE. Indeed, the proposed CC regulatory policy would <u>harm FTM calling parties</u> because they would have fewer people they could reach by a FTM call. If I were to include the additional consumers surplus for the new subscribers, the difference would be even greater. Thus, I conclude that the CC draft policy is not in the Long Term Benefits of End-Users (LTBE) and would harm exactly the parties that the CC claims to be helping.

26. I now repeat my calculations for 2010 again using the CC Draft Report assumptions. (p. 87) I use a counterfactual FTM price of $0.3287 and an assumed

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[33] I have used this approach in my previous academic research. See J. Hausman, "Valuation and the Effect of Regulation on New Services in Telecommunications," *Brookings Papers on Economic Activity: Microeconomics,* 1997, "Cellular Telephone, New Products and the CPI," *Journal of Business and Economics Statistics*, 1999, and "Efficiency Effects on the U.S. Economy from Wireless Taxation," *National Tax Journal*, 2000

[34] In these calculations I assume that the FTM effect on mobile subscription is small enough to be ignored. Allowing for an FTM effect on mobile subscription finds that the current FTM prices compared to the CC proposed prices have increased consumer surplus in the range of 3.4-11.9.

regulated FTM price of $0.2687 corresponding to a counterfactual mobile termination rate of $0.22 and a regulated mobile termination rate of $0.16 with an assumed 100% pass through. I estimate lost consumers surplus to calling parties using FTM to be between $11.0-$47.1 million per year. In terms of increased consumers surplus from lower FTM prices I estimated the change in consumers surplus to be between $3.4-$3.8 million year. Thus, the ratio of the additional consumers surplus from the current FTM prices compared to the CC FTM regulated price is in the range of 3.2-12.4.[35] The CC proposal would again make New Zealand consumers significantly worse off in 2010, and thus is not in the LTBE. Since the proposed CC policy makes consumers worse off in 2006 and 2010, it will also make consumers worse off in the years between 2006-2010. Even without taking into account direct and indirect costs of regulation, the CC propose decreases consumers surplus and is not in the LTBE.

27. I now include the loss in consumer surplus to new subscribers from the proposed CC regulatory policy. As expected, the estimates demonstrate an even more unfavorable outcome. For 2006 the ratio of the additional consumers surplus from the current FTM and mobile subscription prices compared to the CC FTM regulated price and changed mobile subscripts prices is in the range of 4.5-14.2.[36] For 2010 the ratio of the additional consumers surplus from the current FTM and mobile subscription prices compared to the CC FTM regulated price and changed mobile subscripts prices is in the range of 3.8-12.8.[37] Again, even without taking into account direct and indirect costs of regulation, the CC proposal decreases consumers surplus and is not in the LTBE.

28. These calculations demonstrate the outcome that my academic research over the last 10 years has found repeatedly: the change in consumers surplus from a new good, here the ability to reach a person on his or her mobile, leads to much greater gains in consumers surplus than from price changes, unless the price elasticity is

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[35] In these calculations I assume that the FTM effect on mobile subscription is small enough to be ignored. Allowing for an FTM effect on mobile subscription finds that the current FTM prices compared to the CC proposed prices have increased consumer surplus in the range of 2.3-8.6.

[36] If I take account of reduced terminating minutes because of reduced subscription these ratios increase to 7.6-22.0.

[37] If I take account of reduced terminating minutes because of reduced subscription these ratios increase to 5.9-18.3.

quite high. Both the CC and Prof. Armstrong have erred in their analysis because they do not account for this welfare effect from new subscribers to people who call them.[38] If the elasticity of FTM calls were very high, I might not find this result. But a high FTM price elasticity would demonstrate the importance of close substitutes, and the CC could not claim that a regulatory problem exists.

29. Where previous analysis of this problem has gone wrong is to miss the non-substitutable nature of the party receiving the call. In the usual two-sided market situation, often discussed in the academic literature, where women receive a "subsidy" to attend a bar/dance to attract more men to the bar, a high degree of substitution exists among women who would attend.[39] Similarly, if one more store signs up to accept a given credit card or a debit card the extra store will typically have a high degree of substitution with other stores that have already agreed to accept the cards.[40] Thus, in many two-sided markets significant substitution exists on one side of the market.

30. In CPP situations this result does not hold true since calling another person is typically not a good substitute. For example, if I want to reach my research assistant at MIT, I typically cannot substitute a call to another person. When (s)he subscribes to a mobile service, I receive a large amount of consumer surplus because I have the ability to call at any time to see how our research is proceeding.[41] This "new good" quality of FTM calls to additional mobile subscribers is what sets this situation apart from the usual two-sided market situation in terms of estimating the LTBE.

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[38] See M. Armstrong , "Competition in Two-Sided Markets," revised Feb. 2004 mimeo. Prof. Armstrong fails to take account of the "new good" aspect of additional mobile subscribers in his analysis where he claims that a regulated FTM price would increase consumer surplus. The previous academic literature that I am familiar with does not take account of this "new good" aspect because it typically assumes that subscription is invariant to pricing. This assumption may be a reasonable approximation for wireline service, but is incorrect for wireless service.

[39] In situations where a high degree of substitution does not exist, one partner invites the other partner to attend as a "date." Similarly, some parents will pay for a mobile subscription for their children or a firm will pay for its employees' mobile subscriptions, but the usual situation is that a calling party does not have a sufficiently close relationship with the called party to subsidize the mobile subscription.

[40] When a high degree of substitution does not exist in the U.S., e.g. WalMart, the store typically receives significantly lower rates from the credit card or debit card provider.

[41] I receive additional consumers surplus from the "option value" of being able to reach my research assistant at almost any time, beyond the consumers surplus I receive from actual calls made. I have not taken account of the option value in my calculations of consumers surplus.

31. I conclude that the proposed CC regulatory policy would harm FTM calling parties. The CC has not taken into account the extra consumers surplus (economic welfare) that arises to calling parties from their ability to reach individuals who subscribe to mobile telephony in a more convenient and timely manner. Thus, the proposed CC regulatory policy would harm the LTBE.

D. Possible CC Responses

32. The CC can attempt to reject this economic analysis under either of two assumptions: (1) mobile companies will not increase subscription prices if they achieve lower revenue on FTM calls or (2) customers do not make subscription decisions based on price. I consider these assumptions. The CC analysis depends on the assumption that fixed carriers will pass on lower charges from the mobile carriers to retail FTM call prices. Economic analysis demonstrates that even a monopolist has an economic incentive to pass on part of a decrease in input costs. The amount that a firm passes on depends on the shape of the demand curve and the amount of competition; see J. Hausman and G. Leonard (1999).[42] The greater the amount of competition, holding other factors equal, the higher the proportion of the cost decrease that is passed on to final consumers.

33. However, it would be an extremely inconsistent position for the CC to assume that the fixed carriers and other FTM retail providers will pass on some portion of lower costs and yet to assume that mobile providers will not decrease the amount of their handset subsidies or increase their outgoing call price when their mobile termination call prices are decreased due to regulation. This assumption would be equivalent to assuming that VOD and Telecom would act in an economically irrational manner as I demonstrated above. Indeed, since mobile competition is quite high for these carriers I would expect that a large proportion of the reduction in mobile terminating revenue to be passed on in reduced subsidies and higher prices to mobile subscribers. I note that all economists in the ACCC review proceeding have agreed that the mobile carriers using (at least part) of the

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[42] J. Hausman and G. Leonard, "Efficiencies from the Consumer Viewpoint, " George Mason Law Review, 7, 1999.

revenues from mobile termination calls to lower subscription prices or to subsidize handsets. Further, the assumption of no increase in subscription prices would be inconsistent with real world outcomes in the UK that I discussed above.

34. The other possible assumption that the CC could make is to assume that a decrease in handset subsidies or an increase in outgoing mobile call prices will not affect mobile penetration. This assumption would be equivalent to assuming that demand curves do not slope downwards. The assumption would also be inconsistent with my previous academic research and other academic research noted above, that finds a significant own price elasticity for mobile penetration with respect to the price of handsets and mobile calls. Indeed, since "high consumer surplus" customers would on average be the early adopter of mobile, more recent customers are likely to be more price sensitive because they do not receive as high a value from their mobile subscriptions. Thus, their price elasticity would be expected to be higher than previous econometric estimates have found. However, I note that this does not decrease the value of an FTM call to a new mobile subscriber because in a two-sided market, potential callers typically do not have a direct mechanism to cause individuals to become mobile subscribers.[43] Thus, the assumption that mobile subscribers are not sensitive to the price of mobile subscriptions would neglect two centuries of economics and substantial empirical evidence to the contrary.

35. I further emphasize that another major inconsistency exists with the CC model of the change in consumers surplus. The CC has decided not to regulate 3G FTM because of decreased investment incentives. I agree with this decision. However, the implication of this decision makes the results in Tables 16-19 extremely unlikely to hold true. The CC proposes to reduce the mobile termination rate by $0.10 in 2006 and by $0.06 in 2010 from what would be the (assumed) profit-maximizing price. This regulated price decrease will give the mobile operators an additional economic incentive to migrate mobile subscriber from 2G networks to 3G networks. Given the rapid changes in technology and the many additional

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[43] In some instances an employer may subsidize a mobile subscription or a parent will pay the subscription for a child. However, in the large majority of situation a potential FTM caller has no way to cause a potential mobile subscriber to actually subscribe to the service.

services that 3G will offer, e.g. Internet broadband capability and digital TV among other services, the combination of improved services and economic incentives are extremely likely to make the factual number of FTM minutes in say 2010 well below the CC estimates in Table 17. Indeed, since the CC estimates find the largest benefits in the last years of the study period, the estimated net benefits are likely to be extremely inaccurate.

36. The CC (¶ 546-547) accepts the economic fact that 3G networks will be constructed in NZ during the study period. The Report also recognizes that mobile operators will have an economic incentive to shift customers to 3G. (¶ 553) While the CC Draft Report (¶ 565) claims that 3G will not create an inaccuracy in the estimated net benefits, the CC seems implicitly to have assumed that mobile operators will behave in an economically irrational manner.[44] When Telecom and VOD build their 3G networks, they will attempt to migrate subscriber away from the regulated 2G network to the unregulated 3G network because profits will be higher absent regulation.[45]

37. I briefly consider the possibility of a price squeeze. A price squeeze occurs when an equally (or more) efficient fixed line provider cannot compete with Telecom. Thus, Telecom would need to be pricing its fixed line components, e.g. FTM and long distance, below its marginal costs before a price squeeze could occur across an entire market segment.[46] I note that a price squeeze does not make economic sense unless Telecom could drive competitors out of the market and the competitors would not re-enter later when Telecom increased the FTM price.

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[44] I find it puzzling that the CC (fn. 97) recognizes that 3G is likely to shift the demand curve, but then does not take of the possibility in its estimates. By 2010 I cannot believe that a substantial amount of current 2G subscribers will not have shifted to 3G, especially given the market experience in Japan and Korea. Further, if new mobile entry occurs, e.g. Telstra-Clear, it will be 3G entry with roaming onto 2G networks. It would be extremely unlikely that a new mobile entrant would build a 2G network given the presence of 3G technology.

[45] The CC states, "The Commission assumes that such a shift [from 2G to 3G] will occur over the study period and that mobile operators are likely to either retain uniform pricing of fixed-to-mobile calls, regardless of the terminating network, or to price 3G voice calling lower than that of non-3G calls." This claim is not based on any economic analysis and, if true, would imply adverse dynamic efficiency effects regarding the incentive to invest in 3G, because it would imply that regulation of 2G termination rates restrains the prices of 3G terminating rates. Further, since the CC finds that 3G costs will be less than 2G costs (¶ 550) yet another reason will exist for mobile operators to migrate customers to 3G.

[46] Pricing below cost to a few customers, typically to "meet competition," does not constitute a price squeeze. The entire bundle of services must be unprofitable for a price squeeze to occur.

Otherwise, Telecom is sacrificing current profits in an unsuccessful price squeeze and is acting in an economically irrational manner. Given regulation in NZ and the presence of the Telstra-Clear network, Telecom could not hope to monopolize the FTM market. Further, significant barriers to entry and expansion do not appear to exist given recent market experience since Telecom is losing share to competitors. Lastly, the overall margin between FTM prices and mobile termination charges seem sufficiently large that it seems unlikely that Telecom is be setting the fixed line bundle below its marginal costs.[47]

38. The CC Report fails to note that Telecom receives the mobile termination charge regardless of the fixed line provider, and a price squeeze, which entails pricing FTM below the sum of the termination price plus the marginal cost of the fixed line component, means that Telecom would be decreasing its profits now in the hope of monopolizing the FTM market in the future. Also, note that given the high penetration of mobile phones in NZ that sufficient substitution would exist from FTM to MTM to stop Telecom from monopolizing the FTM market assuming that such a market exists. Thus, I am unaware of any economic evidence that Telecom is engaged in a price squeeze and it would not seem to be a rational economic strategy for Telecom to attempt a price squeeze.

IV. Effects on Correct Market Definition

39. To an economist the purpose of market definition is to demarcate firms that have a significant constraining effect on prices for a given product or service.[48] Market definition is instrumental to help guide competitive analysis and it should not determine the outcome of the competitive effects analysis. Here the service at issue is mobile termination service. The CC has decided that the correct market definition is a national wholesale market for the supply mobile of termination service on each mobile network. (¶ 141-143) I disagree with the CC approach. I conclude that subscription, origination and termination should be considered in the same relevant market. Otherwise, the market definition as used by the CC

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[47] I understand that Telecom's calculations demonstrate prices well in excess of average cost, which typically far exceed marginal costs in telecommunications.
[48] This definition is consistent with the CC approach to market definition discussed in the Report, ¶ 73.

leads to the conclusion that mobile operators are engaged in economically irrational behavior.

40. The economic analysis above demonstrates that a profit-maximizing mobile provider will take account of the effect of its terminating price on its subscription (and originating) price and vice-versa. Thus, mobile subscription prices are lower because operators take account the effect of higher prices on the number of subscribers who can receive terminating calls, e.g. FTM or MTM calls. If mobile terminating prices are decreased due to regulation, the economic analysis demonstrates that mobile subscription prices will increase. Thus, the price-setting decisions are linked and both mobile termination services and mobile subscription services should be considered within the same market.

41. Using the CC approach to market definition, economic analysis cannot explain observed market actions. If the markets are separate a profit maximizing mobile provider should be charging the highest price it can in each market subject to competition. If regulation decreases the mobile termination price, the mobile provider should not be able to profitably increase the mobile subscription price; otherwise, it was not profit maximizing before the regulatory intervention. However, economic analysis demonstrates that a profit maximizing mobile firm will increase its mobile subscription price, which demonstrates the linkage between termination and subscription. This linkage also permits an understanding of likely behavior, which could not be correctly understood if the two termination and subscription services are not linked together in an overall mobile services market. Under the CC approach after regulation, when the price of subscription services increases, the conclusion must be that either the mobile operators were not profit maximizing before the regulatory change which implies economically irrational behavior. Alternatively, the incorrect conclusion would need to be that the mobile operators had formed a cartel (or coordinated their actions) yet no behavior of this type would have occurred.

42. In terms of the hypothetical monopolist test, according to the CC Report (¶ 143) both VOD and Telecom are already monopolists in two separate markets for terminating mobile services. Thus, they should already be charging the profit

maximizing price. Now consider the following hypothetical outcome: suppose that the Telecom marginal cost of originating calls decreased because of a technological advance in CDMA networks. From equation (1) when c_1 decreases the price of a_1 decreases so that originating call price would decrease. How much the originating call price decreases depends on the derivative $\dfrac{\partial q_1}{\partial a_1}$, the Telecom own price elasticity of originating calls, which in part depends on how much competition there is between Telecom and VOD.[49] But when a_1 decreases Telecom will gain customers, and it will typically find it profit maximizing to increase its terminating price a_2. How much a_2 changes will be in part determined by how much a_1 changes which depends on the degree of competition between Telecom and VOD. Thus, Telecom cannot be a monopolist in its own termination service. I conclude based on the hypothetical monopolist test that the CC market definition is incorrect.

43. Once it is recognized that Telecom's actions are in part determined by competition with VOD, the market definition must be broadened to take account of both originating services, subscription services, and mobile termination services. Note this conclusion does not depend on joint and common costs or Ramsey pricing. The conclusion arises from profit maximization within the context of a two-sided market, which is an essential economic factor in mobile telephony.

V. <u>Effects of Two-Sided Markets</u>

44. In analyzing the market definition question, it is crucial to recognize that mobile services are an example of a "two-sided" market. A two-sided market exists where customers demand and valuation of a product or service depends on the usage by the other side of the market. Thus, an important factor in the decision to purchase mobile service by many subscribers is whether they can reach people who have mobile phones and whether other people can reach them. As the

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[49] In technical economic terms, by the Slutsky equation the own price elasticity depends on the cross price elasticities between competitors. I assume here that the marginal cost of originating calls does not change for VOD.

penetration of mobile phones increases the demand and value to a consumer increases because the consumer will be able to call more people who will have mobile phones and more people with mobile phones will be able to the consumer.

45. The two sided market feature is common in many network industries and often leads to a firm or government subsidizing one side (or both sides) of the market to increase demand. In fixed line telecommunications government policy in many countries, including the U.S. and Australia, was to subsidize local residential telephone services because as more households subscribed the network became more valuable to all subscribers.[50] Also, in the U.S. most banks allow "free" transactions for consumers for the use of online debit cards because the banks' goal is to cause more merchants to purchase the necessary equipment to allow them to accept online debit transactions.[51] Other examples are auction platforms (e.g. ebay), videogame platforms (e.g. Nintendo, Sony Play Station, and Microsoft X-Box), and software producers who must attract both users and applications developers.[52] Analysis of economic welfare and regulatory policy are usually very different in the context of two sided markets than in the traditional one-sided market situation.[53]

i. Effect on Possible Mobile Termination Market Definition

46. When I consider the possibility of a mobile termination services market only, a hypothetical monopolist who attempted to increase price above competitive levels would again lose demand from two sources, because of the two-sided market. The large majority of terminating calls are MTM calls, not FTM calls. Thus, a hypothetical monopolist would recognize that increasing the terminating price for

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[50] As fixed line penetration approaches 100%, this policy has become less important.

[51] In the U.S. a competing service of offline debit cards is also available, and the merchant use its credit card acceptance equipment for these transactions. Another often-used classroom example of two sided markets, is bars that have free admission or lower priced drinks for female customers with the aim of increasing the demand from male customers.

[52] For example, software platforms often charge a low price for the applications development kit and often provide software development support for free.

[53] In a recent paper by J. Rochet and J. Tirole, "Two-Sided markets: An Overview," the authors state: "It [the paper] also shows that policies adopted by two-sided platforms are radically different that those that are optimal under the "vertical view" of markets, in which the platform supplies an input to sellers who then deal with buyers (so the platform interacts with only one side of the market)." (p. 4) A fundamental mistake in the CC approach to mobile termination is that its analysis follows the "vertical view" of the market in which mobiles operators supply mobile termination input to fixed networks who deal with calling parties. The CC fails to take account of the two-sided nature of mobile termination in its analysis.

mobile calls will lead to decreased demand from potential mobile customers who plan to make outgoing MTM calls, but would now find these calls to be more expensive.

47. From these considerations it follows that to do a correct economic analysis of the mobile services market, one must consider the effects of a given price increase that arise from originating service effects and terminating service effects. Almost no mobile subscriber would purchase mobile service for only originating service or only for terminating service. When a potential consumer subscribes, (s)he would make the decision whether the monthly subscription price is less than the combined value received receives from originating calls and terminating calls, which she receives for "free." Thus, the hypothetical provider of mobile service would take both originating and terminating services into account when setting its price, since the combined revenues from both services must pay for the variable costs and the fixed costs of the mobile network infrastructure.

48. Given the facts that consumers who subscribe do so on the basis of both outgoing and incoming calls compared to monthly subscription price and that mobile providers (and the hypothetical monopolist) will take into account both originating prices and terminating prices in the attempt to gain maximum profits, I conclude that a mobile services market comprising both origination services and termination services provides the correct market definition to analyze competition.

        ii.   Efficient Pricing Policy in Two-Sided Markets

49. Above I emphasized the importance of recognizing the two-sided nature of the market which involves mobile termination. The CC appears to recognize that the markets are two-sided in nature (¶ 128), but it refuses to accept the economic implications of two-sided markets. However, the CC makes a significant mistake because it does not take account of this factor in its analysis. The CC states:

> "As discussed in Chapter 4, the Commission's view is that limited competition in the market for mobile termination is resulting in mobile network operators setting mobile termination rates considerably above cost, and this is resulting in limited competition to the detriment of end-

users in the downstream retail market for tolls and fixed-to mobile services." (¶ 62)

However, in a two-sided market, however competitive it may be, I would expect to see some prices have a greater margin over cost than other prices. This expected result occurs because the economic externality that arises in two sided market causes prices to diverge from costs, if the prices are economically efficient.[54] The CC makes a fundamental mistake in not recognizing that efficient prices will diverge from costs in a competitive two-sided market. I now demonstrate why prices diverge from cost in an (effectively) competitive two-sided market.

50. I give two examples of differential pricing in competitive two-sided markets. While I recognize that the first example may be "trivial", it demonstrates the point about two-sided market very vividly. Consider a bar/pub that serves drinks. Because of intense competition it will charge competitive prices. The bar now decides to introduce dancing. Typically it will offer reduced admission fees or reduced drink prices (if permitted by regulation) for women.[55] To break even it will charge a higher admission price to men or higher drink prices to men, if no admission is charged. No market power is present, yet the bar charges higher prices for drinks to men and lower prices for drinks to women. The bar will find this strategy economically efficient because men receive an (network) externality from women being present to dance with. The bar has no monopoly over women nor is it an "essential facility" or "bottleneck", but by offering a "subsidy" to women it competes better.

51. A more "serious" example with the same properties Internet auction sites. Buyers and sellers on Internet auction sites both pay transaction fee for each sale. However, sellers typically are required to pay a registration fee to begin a new

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[54] An externality arises from an activity that affects other people without those other people paying or being paid for the activity. Economists have recognized at least for the last 80 years that to be efficient in the presence of an externality, prices must reflect the positive or negative value of the externality.
[55] The drink prices are often above marginal cost, but lower than the prices charged to men for drinks.

auction for a good they want to sell.[56] Thus, buyers receive "more favorable" treatment than sellers.[57]

52. A somewhat similar outcome occurs in mobile where Calling Party Pays (CPP) exists. The calling party receives economic value (consumers surplus) when it makes a FTM or MTM call.[58] The more subscribers to mobile services, the more economic value it receives arising from the (network) externality. However, typically a caller cannot help pay the monthly subscription fees for a potential mobile subscriber.[59] But it will increase profits if a mobile company can attract more subscribers since that will lead to more FTM and MTM calls. Thus, the competitive strategy will be for a competitive mobile company to charge "above (TSLRIC) cost" prices for mobile termination calls and subsidize mobile phones to subscribers to increase penetration.[60] This outcome arises from competition and the presence of a two-sided market, not from the exercise of market power. Under effective competitive no excess profits will exist since they will be competed away, yet the results of prices not equal to costs will remain.

53. Thus, the CC has made a fundamental mistake in economic analysis by comparing the price of mobile terminating services to cost (¶ 182) and, upon finding a divergence, deciding that a competitive problem exists.[61] More

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[56] On ebay the seller pays a registration fee to sell a good and a transactions fee if the good is sold. The buyer pays no fee and thus receives a complete subsidy for the use of the service. This outcome where the platform makes little or no money on one side of the market and recoups costs on the other side of the market is very common in two-sided markets.

[57] Other examples exist of two-sided markets with a common property that one side of the market is subsidized while profits are made on the other side of the market.

[58] The economic value of the call exceeds the price of the call would not be made.

[59] Many corporations pay for or subsidize mobile service for employees so they can be reached when necessary.

[60] Subsidizing mobile phones to increase penetration is discussed in J. Hausman, "Mobile Telephone," in M. Cave et. al. eds, Handbook of Telecommunications Economics, North Holland, 2002. These subsidies exist in countries with either CPP or RPP (receiving party pays) such as the U.S., where general agreement exists that the mobile market is extremely competitive. Subsidies of this type also exist for many other goods, e.g. satellite dishes for pay TV in the U.S., where no market power exists since cable TV is about 5 times larger that satellite TV. The reason for these subsidies is because consumers act as if they have high discount rates when purchasing equipment upfront. This effect was first discussed in J. Hausman, "Individual Discount Rates and the Purchase and Utilization of Energy Using Durables," Bell Journal of Economics, 1979 and has been found in numerous other studies across many different markets over the past 25 years.

[61] The correct approach is to compare price to a competitive benchmark not to incremental cost, given the two-sided nature of the market and the large amount of fixed and common costs in mobile networks. I note that in Australia the mobile termination rate for both Hutchison and Vodafone, neither of which can have

seriously, the CC proposed regulatory pricing policy, by not allowing the externality to be reflected in prices, will lead to an economically inefficient outcome as my calculations above demonstrate.

iii. Other Reasons for Divergence of Prices from Costs

54. Even in the absence of two-sided market, an additional reason exists for prices to diverge from costs. Mobile networks have significant fixed costs. If they only provided a single product, effective competition would cause price to equal average total cost. However, mobile providers are multi-product firms that have significant fixed and common costs.[62] For multi-product firms, either regulated or unregulated, average costs of a product no longer exists. Prices are set above (marginal) costs so that these fixed and common costs can be recovered. Otherwise, the firm would go bankrupt.[63] Thus, Hewlett-Packard (HP) which competes in many markets will decide how to mark up its costs to determine prices. In some markets such as PCs, the percentage markup of price over costs will be very small while in other market the percentage markup will be higher. Overall, while HP earns a normal economic profit because of competition, we expect these differential markups to exist. Indeed, they lead to ("second-best") economically efficient prices.[64]

55. While the CC recognizes the importance of fixed and common costs at numerous points in its report, it does not take correct account of their importance. First, it puts the onus on the mobile providers to "prove" that their prices are efficient.

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market power since the ACCC states that are not earning their WACC, is quite close to their mobile origination rate where significant competition exists. Since mobile termination rates are roughly similar in Australia and New Zealand, the use of a competitive benchmark demonstrates the absence of market power in mobile termination rates in NZ. Indeed, the CC (¶ 202) admits that price above cost does not demonstrate limited competition or otherwise the CC could not explain the price of toll calls, which it considers a competitive market.

[62] Common costs are costs that cannot be assigned uniquely to a given service.

[63] Thus, the CC proposed regulatory policy (¶ 592, 598) of using TSLRIC does not allow for mobile termination to cover any fixed and common costs. This policy would appear to violate the "regulatory bargain" that investment by a regulated company will be permitted to recover its economic costs. In the U.S. this bargain has been certified by the U.S. Supreme Court in a long series of decisions over the years.

[64] "First best" is price equal to marginal costs but this outcome cannot exist in the presence of fixed and common costs. The "second best" solution exists when fixed and common costs are covered so that prices exceed costs, but economic distortions are minimized. Effective competition will typically cause this outcome to occur. This analysis has been recognized by economics for the last 70 years.

Yet economic analysis expects efficient prices to have different percentage markups so I do not see why the operators must prove their markups are efficient when differential markups are expected under competition. To the contrary, I expect the CC to attempt to demonstrate that its regulatory proposal would improve the LTBE. The CC approach attempts to do so, but it makes a mistake by only considering FTM prices. The CC approach fails to take into account the effect that arises from the two-sided feature of the market of whether a potential FTM caller will be able to reach the person who may not subscribe to mobile service, depending on the prices charged in the market.

56. <u>Appendix</u>

I demonstrate that subscription prices will increase if regulation forces down the mobile termination prices. From the FOC for profit maximization for equation (2):

(A1) $\qquad 0 = x + \frac{\partial x}{\partial m}[(m - c_0) + \frac{\partial q_1}{\partial x}(a_1 - c_1) + \frac{\partial q_2}{\partial x}(a_2 - c_2)]$ $\qquad$ (A1)

I assume that for small changes in the mobile termination, price, a_2, that the derivatives $\frac{\partial q_1}{\partial x}$, $\frac{\partial q_2}{\partial x}$, and $\frac{\partial x}{\partial m}$ remain constant.[65] Holding a_1, c_1, and c_2, constant, I totally differentiate equation (A1):

(A2)

$$0 = \frac{\partial x}{\partial m}dm + \frac{\partial^2 x}{\partial m^2}[(m - c_0) + \frac{\partial q_1}{\partial x}(a_1 - c_1) + \frac{\partial q_2}{\partial x}(a_2 - c_2)]dm + \frac{\partial x}{\partial m}dm + \frac{\partial x}{\partial m}\frac{\partial q_2}{\partial x}da_2 + \frac{\partial x}{\partial a_2}da_2$$

Solving, I find:

(A3)

$$\frac{dm}{da_2} = -\{\frac{\partial x}{\partial m}\frac{\partial q_2}{\partial x} + \frac{\partial x}{\partial a_2}\} \bigg/ \{2\frac{\partial x}{\partial m} + \frac{\partial^2 x}{\partial m^2}[(m - c_0) + \frac{\partial q_1}{\partial x}(a_1 - c_1) + \frac{\partial q_2}{\partial x}(a_2 - c_2)]\} < 0$$

which follows because the numerator is negative and the denominator is negative by the second order conditions of profit maximization.[66] Equation (A3) demonstrates that if a_2 decreases then m will increase. Thus, the CC claim that the "waterbed effect" does not occur implies lack of profit maximization by mobile firms or equivalently that mobile providers behave in an economically irrational manner.

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[65] This assumption may be relaxed and the results will not change because of the concavity of the profit function with respect to prices.

[66] This result follows from the concavity of the profit function with respect to prices.